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ABSTRACT

To explore the reading strategies of normal and retarded children, based on higher and lower order reading responses, 26 educable mentally handicapped and 24 first graders (equated for reading achievement) were tested. It was hypothesized that normals would make more higher-order reading responses than educables and educables would make more lower-order reading responses than normals. Data were based on errors and other responses during reading. Results were felt to confirm the hypothesis predicting the relationship between educables and low-level responses and partially confirm the hypothesis of higher-level responses for normals. It was concluded that inculcation of efficient reading strategies is a legitimate educational goal for the mentally handicapped. (CD)

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ABSTRACT

This study tested hypotheses predicting normals would make more higher-order reading responses than retardates and retardates would make more lower-order reading responses than normals. Subjects were educables and first-graders equated for reading achievement. Data were based on errors and other responses during reading. Results confirmed hypotheses predicting retardates would make more lower-level responses. Hypotheses predicting more higher-level responses for normals were partially confirmed. Lack of support for remaining higher-order hypotheses was related to possible ideographic responses by retardates. It was concluded inculcation of efficient reading strategies is a legitimate educational goal for retardates.

HIGHER-ORDER AND LOWER-ORDER READING RESPONSES OF MENTALLY RETARDED AND NORMAL CHILDREN AT THE FIRST-GRADE LEVEL*

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This study presents an analysis of higher- and lower-order reading responses.[1] The general purpose of this analysis was to obtain insights into mediational processes, or strategies, underlying reading. Studies concerned with mediational processes typically employ a logical analysis of responses assumed to reflect those processes. The act of reading, constrained as it is by a precisely determined set of visual cues, lends itself readily to this sort of analysis. Modes of departure from expected responses, as reflected in reading errors, have proved a particularly useful index to these processes.

A number of researchers in retardation have investigated specific reading errors, such as reversals (Dearborn, 1930, Orton, 1937), or substitutions based on contextual cues (Chipman, 1935). However, studies concerned with a varied range of reading errors by retarded subjects seem limited to those by Dunn (1954) and Sheperd (1967). Dunn's study was stimulated by the paucity of information about reading processes of the retarded and the need for such information as a base for teaching. His population consisted of educable and normal subjects with a mean MA of 9-2. Reading error data indicated that retarded subjects had more

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faulty vowels, omissions of sounds, words aided and refused, and fewer repetitions and additions of sounds. On the other hand, normal subjects did better in the use of context cues. There were no significant differences between the two groups on faulty consonants, reversals, additions of sounds, substitutions of words, or omissions of words.

A similar study by Sheperd used a population of retarded subjects with a mean MA of 8-5 who were subdivided into adequate and inadequate readers. He obtained results that were partially compatible with those of Dunn. The inadequate reading group had more faulty vowels, faulty consonants, reversals, omission of sounds, substitution of words, and words aided and refused, while the adequate group had more repetitions. Differences between the two groups on addition of sounds, addition of words, and omission of words were nonsignificant.

A clinically oriented study by Mackinnon (1959) compared a traditional program for beginning readers with an experimental program that used stick-figures as "non-verbal abstractions" of meaning. Protocols were analyzed for such variables as omissions, insertions, substitutions, repetitions, and self-corrections. Mackinnon's experimental group performed better than his controls, but both showed common patterns, such as initial reliance on context and word configuration and a tendency to search for additional clues at difficult moments. He found that faulty modes of response persisted longer in controls, as compared to experimental subjects. On the other hand, experimental subjects tended to make more self-corrections, and were more concerned with confirming their responses. Apparently Mackinnon's experimental program produced more higher-order, self-evaluative responses as compared with the control program.

Using a population of New Zealand children, a study by Clay (1967) dealt with such variables as error ratios, repetitions, regressions, and self-corrections. Clay presented a number of speculations about processes involved in early reading. Readers start out by depending on a low-level strategy, namely, auditory memory. After a time, they start paying greater attention to visual cues. The successful reader seems to make an active effort to compare these with his linguistic responses and, if they fail to match, he is apt to search for a more appropriate response. Clay remarked that dissonances of this sort were a fruitful source of learning for the beginning reader. She also suggested that repetitions and regressions serve to confirm responses and help the reader regain his equilibrium, or fluency.

The studies by Clay and Mackinnon suggest that salient characteristics of the successful first-grade reader include a problem-solving approach and an ability to use multiple cues. These characteristics are directly relevant to the present study.

The most important single influence on the development of this study was Goodman's work on the analysis of miscues, or reading errors. His special focus has been on psycholinguistic processes involved in reading and he has developed an elaborate taxonomy as a base for inferring these processes. Aspects of this taxonomy were incorporated into the response classification used for the present study. Subjects for one of Goodman's studies (1968) consisted of 12 fourth and fifth grade pupils who read from an unfamiliar text. Twenty-eight psycholinguistic categories were used to differentiate a variety of miscues, along with such reading responses as regressions, self-corrections, and use of syntactic information.

The present study, like that by Goodman, has undertaken a broad description of reading performance. However, it also seeks to examine a further aspect within this performance, namely, differences in the reading strategies of retarded and normal children.

RATIONALE AND HYPOTHESES

Based on a now traditional classification developed by Monroe (1932), the two studies of retardates cited earlier provided a useful description of characteristic error patterns. By comparison, the studies of normal readers just reviewed produced a more sophisticated, albeit more speculative, analysis of reading errors - one oriented toward the inference of mediational processes. This orientation is in the mainstream of an important contemporary trend in psychological theory and research. Recent publications suggest the need to consider a further dimension in this inferential approach - namely, qualitative differences between cognitive strategies, or sets of processes, as they relate to a given task. The groundwork for viewing strategies in these terms was laid by the work of Piaget (1952), Hunt (1961), and Bruner (1961), among others.

Recent articles by White (1966) and Jensen (1968) focused more directly on qualitative differences between strategies of young children. In the course of elaborating on disparate theoretical formulations, both authors emphasized a distinction between higher-order, more efficient processes and lower-order, less efficient ones. These and other statements suggested that an investigation of reading strategies used by retardates in terms of a higher- and lower-order dichotomy would be timely. Among

other benefits, such an evaluation could produce practical information which would aid the practitioner working with the retarded. The character of their reading performance would be further highlighted if they were compared with those of normal readers. These considerations led the author to undertake an exploration of reading strategies of normal and retarded children based on a postulated higher- and lower-order dichotomy inherent in such strategies.

The study was based on the assumption that reading responses at the first-grade level could be dichotomized into higher- and lower-order categories. This assumption was translated operationally into a series of hypotheses concerned with variables obtained from an oral reading sample. The variables in question corresponded to major response categories that were central to the study.

The study dealt with twelve response categories in all, including nine error categories. The latter were subdivided, in turn, into seven subclasses of Word Substitution consisting of Graphemic-Phonemic[2], Graphemic-Phonemic with Context, Graphemic with Context, Graphemic, Context, Random, and Contextual, along with Morphological Error and No Response. The remaining three response categories were Self-Correction, Regression, and Repetition, and denoted responses that were concomitant with verbal responses, recorded either as correct or incorrect, to the 40 target words. Ten of these 12 response categories were considered primary to the study and were the subject of unidirectional hypotheses developed around the higher- and lower-order dichotomy. The remaining two response categories, Morphological Error and No Response, were the subject of null-hypotheses.

Criteria were developed for classifying response categories under the higher- and lower-order rubrics along the following lines. Higher-order responses were defined as associated either with the presence of multiple cues or with a search for closure. The higher-order designation was considered appropriate for six of ten major categories. Three of these, characterized by the presence of multiple cues, consisted of Graphemic-Phonemic, Graphemic-Phonemic with Context, and Graphemic with Context. These were designated as Multiple Cue Responses (MCRs). The three remaining variables classified under the higher-order rubric consisted of Self-Correction, Regression, and Repetition. These were regarded as suiting the search for closure criterion, and were designated as Search for Closure Responses (SCRs). Such a designation seemed obvious in the case of Self-Correction and Regression, since these apparently represented a search for alternate solution. Repetition was similarly viewed since spontaneous reproduction of a reading response also implied an effort toward mediation, or closure.

In contrast to higher-order categories, lower-order categories were viewed either as associated with single cues, or as characterized by inferiority. Graphemic and Contextual met the first criterion, while Random and Terminal Reversal, with its implication of directional confusion, seemed to meet the second. The four lower-order response categories just reviewed were designated as Simple or Inferior Responses (SIRs).

Based on the rationale just outlined, the following hypotheses were formulated and tested by the study.

MULTIPLE CUE RESPONSES

1. Normal first-grade readers will produce significantly more errors

than mentally retarded readers at the same level a) in the Graphemic-Phonemic category b) in the Graphemic-Phonemic with Context category and c) in the Graphemic with Context category.

SIMPLE OR INFERIOR RESPONSES

2. Mentally retarded readers at the first-grade level will produce significantly more errors than normal readers at the same level a) in the Graphemic category b) in the Contextual category c) in the Random category and d) in the Terminal Reversal category.

SEARCH FOR CLOSURE RESPONSES

3. Normal first-grade readers will produce significantly higher scores than will mentally retarded readers at the same level for a) Self-Correction b) Regression c) Repetition.

As previously noted, there was no reason to expect any differences between retardates and normals in the two secondary error-categories - Morphological Error and No Response.

METHOD

RESPONSE CATEGORIES

While reading researchers have considered a wide variety of reading errors, they have focused the greatest amount of attention on word substitutions (Schale, 1966). A frequent approach is to isolate elements common to the substitution and to the stimulus word that elicited it. The rationale here is that such common elements represent cues that have engaged the reader's attention and have misled him into giving the erroneous response.

As an example, if a child reads ball for boy, it seems reasonable to infer that he focused on the common letter b in the stimulus word, decoded it correctly, ignored or misread the remainder of the word, and thus was misled into producing his response.

Word substitutions may also be analyzed in terms of contextual cues available to the reader. For example, if a child reads "He ran down the street," instead of "He ran down the road," it is likely that he was misled into giving this response by the preceding context. Through analysis of word substitutions and other reading errors, the researcher can develop a base for inferring broad, idiosyncratic patterns governing correct, as well as incorrect, reading performance.

Judgment concerning the use of cues in a given substitution becomes more complex when several are present, as is often the case. In such instances, there is no way of deciding whether a single cue, or some combination of them, was actually used. In the previously cited example where ball was substituted for boy, the letter b had presumably functioned as a graphemic cue. The latter, in turn, could have elicited the corresponding phonemic cue. A contextual cue might also be simultaneously available for use, as in the sentence "He played with the ball," where ball is substituted for boy. Because of these and other complications, judgments concerning response categories in this study were made in terms of availability of cues, rather than actual use. However, a strong correlation between availability and probability of use was assumed.

As previously indicated, seven of the ten major response categories in the present study were subcategories of word substitution. These were

defined in terms of specific cues noted to be available for a given substitution as follows:

Graphemic A substitution in which the common cue present in both the stimulus word and the response is a grapheme.[3] Example: take is substituted for they.

Contextual A substitution which is appropriate to the context. Example: in the sentence "All of us will help," can is substituted for will.

Graphemic-Phonemic A substitution in which the common cues present in both the stimulus word and the response consist of graphemic and phonemic elements, represented by one, or two, identical letters. Example: play is substituted for put.

Graphemic-Phonemic with Context A substitution meeting both Graphemic-Phonemic and Contextual criteria. Example: in the sentence "It is too soon to go," sunny is substituted for soon.

Graphemic with Context A substitution that meets both Graphemic and Contextual criteria. Example: in the sentence "Look, all of you," over is substituted for of.

Random A substitution for which no cues can be discerned. Example: in the sentence "No one knows," they is substituted for knows.

Terminal Reversal A substitution in which a final letter in the stimulus word is used as the initial word in a response. Example: run is substituted for over.[4]

Definitions for the remaining major response categories were as follows:

Self-Correction Subject spontaneously changes a target word. The final

response was the one recorded.

Regression Subject spontaneously "backs up," usually to the beginning of the sentence, and changes a target word. Again, the final response was recorded.

Repetition Subject repeats an initial response to a target word that may have been correct or incorrect.

The response categories just cited have traditionally been treated as errors by reading researchers. However, such authors as Clay (1967), Goodman (1968), and Weber (1968) have recently argued that one or another of these actually serves a mediating, or information-processing function, and hence should not be classified as an error. A similar position is taken in the present study.

Finally, the following definitions were used for secondary error categories:

Morphological Error The stimulus word has undergone a morphological change. Example: mother is substituted for mothers.

No Response No overt response is made to the stimulus word.

SUBJECTS AND PROCEDURE

Subjects[5] consisted of 26 children enrolled in New York public school classes for the retarded, and 24 first-grade children attending regular classes. They were equated for reading achievement through administration of the Wide Range Achievement Test. Table 1 summarizes population data. IQ's for control group were not available but were presumed to be within the normal range.

See Table 1

Materials consisted of a primary level story called "Too Soon for Freddy,"[6] taken from the Betts series. The experimenter recorded the subject's errors on protocols which duplicated reading materials. Repetitions, self-corrections and regressions were also recorded. Tapes were made of each reading performance and used at a later date to provide a revised, more accurate version of the record. Primary data for the study were based on responses to 40 target words randomly dispersed through the text. Percentage of interexaminer agreement for the recording and coding of responses was 91.75.

STATISTICAL ANALYSIS

A Randomization test (Siegel, 1956) was applied to the raw data obtained for all response categories in order to evaluate the significance of differences between retarded and normal subjects. However, these data failed to take into account an important aspect of the subject's reading performance, namely, the proportion of errors in an MCR or SIR category to total number of errors. An error score of five in the Contextual category, for example, would have a far different connotation for a subject whose total errors numbered five than it would for a subject who had made 30 errors. In order to take account of this factor, raw error scores were converted into ratios, based on the proportion of a subject's errors in a given category to his total errors. Scores for SCRs were similarly converted into ratios, based on the proportion of the subject's responses in each of the three relevant categories to his total verbal responses. The Mann-Whitney U test (Siegel, 1956) was selected to test for significance of differences between these ratio data. A difficulty emerged, however, in that many variables showed

a sizeable number of zero scores for both groups. The resulting large number of equal ranks mitigated against obtaining a meaningful result. To deal with this problem, the ten major variables for the study were collapsed and treated in three logical superordinate categories. Graphemic-Phonemic, Graphemic-Phonemic with Context, and Graphemic with Context were grouped together under the MCR classification; Graphemic, Contextual, Random, and Terminal Reversal were grouped under the rubric of SIR; while Self-Correction, Regression, and Repetition were grouped under the SCR rubric.

RESULTS

It can be seen from Table 2 that, despite similar mean errors for total scores, retarded and normal subjects showed quite distinctive error patterns.

See Table 2

MULTIPLE CUE RESPONSES

Table 2 indicates that Hypotheses 1a and 1b were rejected. These had predicted that normal subjects would make significantly more errors than retardates in the Graphemic-Phonemic category and in the Graphemic-Phonemic with Context category. While significant differences between groups were obtained for these variables, in both instances they were in a direction contrary to prediction. The third MCR hypothesis stating that normal subjects would make more errors than the retarded in the Graphemic with Context category was supported.

See Table 3

Table 3 shows that when the raw data for the MCR variables were

converted to error ratios and collapsed, significant differences between groups were obtained for this more comprehensive category, with the direction of difference again going counter to expectation.

SIMPLE OR INFERIOR RESPONSES

Table 2 shows that all three SIR hypotheses were upheld. These stated that retarded subjects would make significantly more errors than normal subjects on Graphemic, Contextual, Random, and Terminal Reversal categories. Table 3 shows similar findings for these variables after they had been combined into a single, more comprehensive category based on error ratio data.

SEARCH FOR CLOSURE RESPONSES

As seen in Table 2, all three SCR hypotheses were supported. These had predicted that normal subjects would produce significantly more responses than the retarded in the Self-Correction, Regression, and Repetition categories. Table 3 presents similar findings for these variables after their combination into a single, comprehensive category based on error ratio data.

SECONDARY ERROR CATEGORIES

Table 2 indicates that retarded subjects made significantly more morphological errors than normal subjects, while normals produced a significantly greater number of No Responses than retardates.

DISCUSSION AND CONCLUSIONS

DISCREPANCY IN ERROR PATTERNS

As previously noted, while total number of errors for both groups

were very similar, error patterns for the two groups showed clearcut differences. One discrepancy was due to the fact that retarded subjects seemed to "prefer" verbal errors, whereas normal subjects tended to produce more No Responses. The question arises as to whether this discrepancy might have reflected some special bias in the study.

Such a bias could conceivably have been related to the retardate's extended exposure to failure in the reading situation. In instances where he could not respond, he might have been prone to give a random verbal response as a means of "satisfying" the teacher, instead of remaining silent and being subject to further prodding. If this were the case, random scores for retarded subjects would have been unduly inflated, and might conceivably have played a critical role in the significant SIR findings. To evaluate the possible effect of a Random response bias in the retarded, SIR error ratios were reanalyzed with Random scores omitted. Significant differences between groups for SIR data in favor of retarded subjects were still sustained.

A second discrepancy between the groups consisted of the fact that the retarded made more morphological errors than normals. However, the meaning of this finding is hard to appraise. A majority of retardates were disadvantaged children who also belonged to minority groups. Hence, their morphological responses would have been partially determined by substandard language patterns characteristic of these groups.

IDEOGRAPHIC READING

The fact that retardates made more MCRs than normal subjects was a puzzling finding, since MCRs presumably represented responses to multiple cues and thus had a relatively complex quality. Under the present

classification scheme, it had been assumed that when specific MCR cues systematically accompanied certain responses, there was a high probability that they had been utilized as such by the reader. However, this need not have been the case. One explanation for the unanticipated MCR findings could be that they actually reflected ideographic responses[7] elicited by concomitant cues which had been overlooked in the present classification. For example, if a reader substituted dog for day, this would have been recorded as a Graphemic-Phonemic error under the present system, whereas the subject might simply have been responding on the basis of a common configuration. If MCRs did incorporate ideographic responses, these data could be expected to form a bimodal distribution, with genuine decoding responses based on MCR cues clustering around one mode, and inferior ideographic responses clustered around the other. The writer postulates that retardates' MCR error scores may have been more heavily contaminated by ideographic responses than those of normal subjects, in which case the higher MCR total for retardates would become understandable.

Klapper (1966) speculated that the successful three-year-old "reader" treats written words as ideographs. Thus, he responds to a familiar configuration simply by retrieving some verbal response previously associated with it. However, reading as true decoding is a vastly more complex process than this. Whereas ideographic reading represents a relatively low-level associational response to a set of familiar stimuli, genuine decoding involves response to symbols that map either singly or in combination onto the phonemes of a spoken language.

Central to the difference here is the fact that the ideographic reader is dependent on an invariant set of stimuli, whereas the decoder is able to respond to stimuli when they occur in novel combinations.

It is likely that the average beginning reader, particularly if he has been taught by the "look-say" method, tends to process words ideographically at very early stages, and probably continues to fall back on occasional ideographic responses after he has started to use genuine decoding. It is also probable that some beginning readers who are potential severe reading problems never progress beyond the ideographic stage. Klapper has commented that certain problem readers, presumably dependent on ideographic responses, emerge suddenly in the second-grade because they have reached a point where they are unable to cope with an ever-growing repertoire of ideographs.

Both groups in the present study could have contained some subjects who relied either occasionally, or perhaps exclusively, on ideographic responses. However, the writer surmises that such subjects would be more frequent among the retarded. While the mean WRAT score for retarded subjects was about 1-8, their mean MA was 7-6, indicating an expected Reading Age of 2-6. Thus, the group as a whole showed a moderate lag in reading performance. This lag becomes rather striking if the older half of the retarded population alone is considered: mean MA for these subjects was 8-6, suggesting an expected Reading Age of 3-6. It is evident that these older retardates had rather severe reading problems beyond those attributable to their retarded status. Such a group would be particularly prone to develop such dead-end reading strategies as ideographic responses. Hence it is plausible to suppose that this group produced a disproportionately

high number of these responses which were inadvertently recorded as MCRs.

Alternate explanations to that offered for the MCR data are also possible. For example, the processing of multiple cues may not actually occur at a higher-order level as posited. Thus, if Graphemic-Phonemic responses were simply based on a lower-level association between a given grapheme and a corresponding phoneme, it could easily follow that retardates would make more frequent errors in this category than normals. Counterbalancing this view are indications in the current literature that when a phoneme is elicited by an associated grapheme, its decoding, even at a simple beginning level, is not necessarily an automatic process. Rather it may require the reader to consider its graphemic environment in terms of the orthographic patterns postulated by Gibson (1963).

It is evident that the theoretical formulations in the present study need clearcut documentation. The interpretation of ideographic reading, in particular, requires objective backing. Analysis of responses in the present study in terms of ideographic cues, even on a preliminary basis, seemed unsuitable for this purpose. Although a judgment could have been made as to whether a stimulus word and a response had a common outline, thus identifying one type of ideographic cue, it would have been more difficult to evaluate those based on distinctive internal features of words. (Examples would be the dot over an i, or a circular form, in the form of an o, in the middle of a word). With the use of more strictly controlled materials, however, it should be possible to design a study that could evaluate the use of ideographic cues by the beginning reader.

If ideographic responses could be demonstrated, the relationship between these responses and reading achievement would be of considerable interest.

LIMITATIONS

One limitation of the study concerned population characteristics. The study population has been described elsewhere (Levitt, in press) in the following terms:

> "Mentally retarded subjects showed considerable heterogeneity, suggesting that a rather elastic interpretation of this category had been used for placement. A majority were disadvantaged, and they also seemed to include a scattering of acting out, emotionally disturbed, aphasoid, and dyslexic children. Again, as a byproduct of equation with mentally retarded subjects, normal subjects had been drawn from the less adequate readers within the available population. Hence, they could have included children who were potential reading problems, as well as some who were "destined" to become mentally retarded."

The heterogeneous character of both subpopulations could have blurred true differences between them. On the other hand, an incidental population characteristic, namely, differential exposure to reading instruction, might have helped to impose distinctive reading patterns on the two groups. The retarded subject with his prolonged, unsuccessful exposure to reading instruction, would tend to become dependent on various unproductive strategies rendered automatic by repeated use. By contrast, while the normal first-grade child might adopt similar strategies, the fact that he was at an early, relatively fluid stage of skill mastery, would make these strategies more amenable to self-correction and instruction.

A second limitation pertains to the amount of data produced by the study. It will be recalled that these were rather scanty in certain categories. Hence, when raw scores were converted to error ratios, it became necessary to combine the ten major response categories into three

more comprehensive ones. To the extent that this procedure attenuated available information, the scanty data obtained for some of the study's variables must be regarded as a further limitation of the study.

READING STRATEGIES AS EDUCATIONAL GOALS

The present study has indicated that reading strategies at the first-grade level differ qualitatively from each other, and that normal children display more efficient strategies than retardates. In turn, these findings suggest that facilitation of reading strategies used by retardates is a legitimate educational goal. A possible approach to implementing this goal is offered below.

Reading has traditionally been viewed as a function of certain requisite abilities. However, there is increasing evidence from this and other studies that reading performance depends not only on abilities, but on activating appropriate strategies for their deployment. It follows that the goals of the reading profession, habitually oriented towards abilities, should begin to encompass these strategies as well. Because the evaluation of reading strategies depends on inference rather than direct observation, the formulation of such goals would surely be a complex undertaking. A first step might be to enlist clinical and research resources in making an inventory of response patterns commonly used by school children. Next, strategies implicit in these responses could be formulated. The most efficient of these could then be selected, perhaps by noting which of these are associated with high reading achievement. Finally, these could be organized on a sequential basis to form a broad set of curricular goals. A complementary set of remedial goals, designed to eliminate the use of

inefficient strategies, could also be devised. A final stage would focus on developing a methodology for implementing such a program. The present study may be regarded as an initial exploration of this approach insofar as it has presented a classification scheme that differentiated between higher-order, efficient strategies, and lower-order, inefficient ones, provided data on various reading strategies, and generated hypotheses about another potentially handicapping strategy - ideographic reading.

A comprehensive model for developing a curriculum pertinent to reading strategies is represented by Covington's (1970) "cognitive curriculum," described by him as a "process-oriented approach to curriculum." He states its principal aim is to teach mental operations and strategies as ends in themselves. This novel approach to education, with its focus on processes, as opposed to content, seems directly relevant to the teaching of reading strategies. A process approach to reading might proceed as follows. At early stages, the program could focus on strategies for identifying and processing relevant cues, shifting attention from one dimension to another, and processing multiple dimensions. Strategies for coping with the variability characteristic of certain aspects of reading could also be introduced at appropriate stages. Examples are: variability in graphemes based on directionality, phonemic variability contingent on adjacent letters, and semantic variability in homonyms based on context. At a more advanced level, the program could deal with strategies for the induction of invariant spelling patterns described by Gibson (1963), and use of syntactic and semantic redundancies as a means of delimiting expectancies for a given response. Finally, strategies related to the

reader's goals might be considered, depending on whether he was reading for a rapid overview, for selected information, or for long-range retention.

The proposed process approach to reading seems to have special relevance to retarded and other handicapped pupils. The work of such authors as Luria (1963) O'Connor and Hermelin (1963), House and Zeaman (1963), and Spitz (1966) suggests that retardates have special problems in information-processing. A deficiency in processing of reading materials also seems probable. Thus, the development of a reading program with a special focus on underlying processes seems particularly appropriate in the case of these handicapped learners.

FOOTNOTES

[1]See pp. 6 and 7 for definition for higher-order and lower-order responses.

[2]See pp. 9 and 10 for description of this and other response categories.

[3]The study used a more detailed set of criteria for classifying responses.

[4]A Phonemic category was originally included but was dropped because responses in this category were negligible. Phonemic was defined as a substitution in which the common cue present in both the stimulus word and the response is a phoneme. Example: us is substituted for of.

[5]A more detailed description of subjects and procedure is given in a recent paper (Journal of Special Education, in press) entitled "The Effects of Context on the Reading of Retarded and Normal Children at the First-Grade Level."

[6]Used by permission of the publisher.

[7]Funk and Wagnalls (1963) define an ideograph as "the graphic representation of a thought." They cite the + sign representing addition as an example.

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TABLE 1

POPULATION DATA

	CA*			IQ			WRAT		
	$\bar{X}$	SD	Range	$\bar{X}$	SD	Range	$\bar{X}$	SD	Range
MR	139.04	19.1	100-172	64.96	5.66	50-72	1.81	.3	1.5-2.2
N	81.25	5.16	76-99				1.84	.2	1.5-2.2

*months

TABLE 2

Comparison of Means for MR and Normal Ss Based on Raw Scores for Response Categories

				ERROR CATEGORIES									OTHER CATEGORIES		
				Multiple Cue Responses			Simple or Inferior Responses				Secondary Error Categories			Search for Closure Responses		
	n	Total Errors	S.D.	Gr-Ph	Gr-Ph & Cxt	Gr & Cxt	Gr	Cxt	Tr	Rdm	Morp	NR	Ind**	Rep	Scn	Regr
MR	26	15.31	8.1	2.12	3.27	.27	.50	.38	.88	.58	2.50	3.54	.31	.81	1.46	.35
Norm	24	15.88	9.2	1.17	2.33	.46	.17	.17	.29	.12	1.46	8.42	.24	1.80	2.58	1.17
t		.24		1.70	1.85	1.19	1.96	1.31	1.84	2.00	2.17	2.27		2.42	1.90	2.43
P		ns		.05	.05	ns	.05	ns	.05	.05	.05*	.05*		.01	.05	.01

* 2-tailed
** Indeterminate Errors. These are presented here to round out the data but are not otherwise considered.

TABLE 3

Differences Between MR and Normal Ss Based on Ratio Scores

	ERROR CATEGORIES				OTHER CATEGORIES	
	Total Multiple Cue Responses (Ratio: Error/Total Errors)		Total Simple and Inferior Responses (Ratio: Error/Total Errors)		Total Search for Closure Responses (Ratio: Responses/Total Verbal Responses)	
	n	Median	Range	Median	Range	Median	Range
MR	26	.392	0 - .550	.098	0 - .363	.068	0 - .194
Norm	24	.212	.027 - 1.000	.018	0 - .182	.162	0 - .410
	U* = 222 z = 1.75 p = .05		U = 191 z = 2.37 p = .01		U = 195 z = 2.25 p = .05	

* Mann-Whitney U Test